



*Swain Gifford woodcut
depicting early Northwest*

Chapter 1 Army Engineers come to the Pacific Northwest

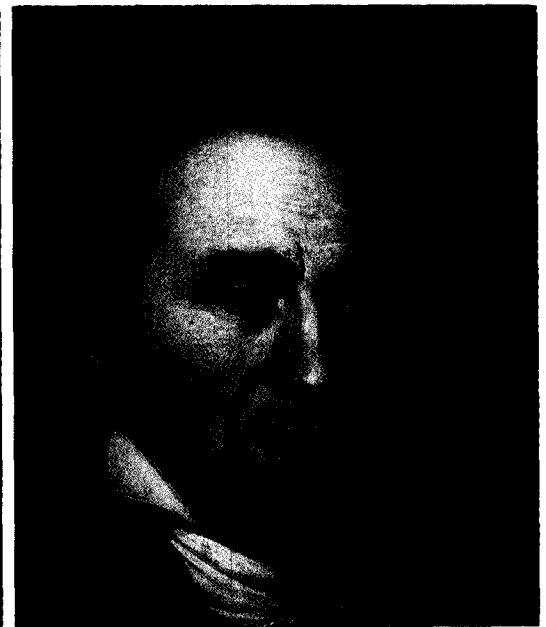
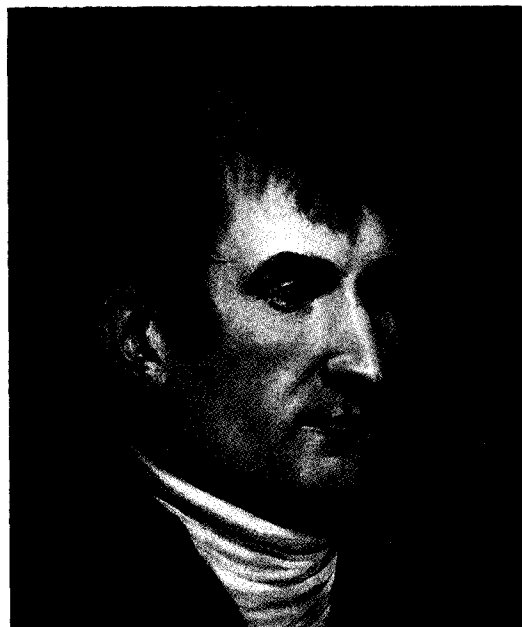
Early Exploration

Organized on 16 June 1775 during the American Revolution and permanently established in 1802, the Army Corps of Engineers played an important part in the westward growth of the young republic. In the early years of the new nation, a sense of national mission linked the future settlement of Oregon and the activities of the Corps of Engineers. The vast resources of the western frontier and the opportunities available to the adventurous permanently influenced the American character and imagination. For nearly one hundred years, the lure of distant mountains and rivers helped create a sense of destiny; expansion to the Pacific became both a challenge and a national mission.¹

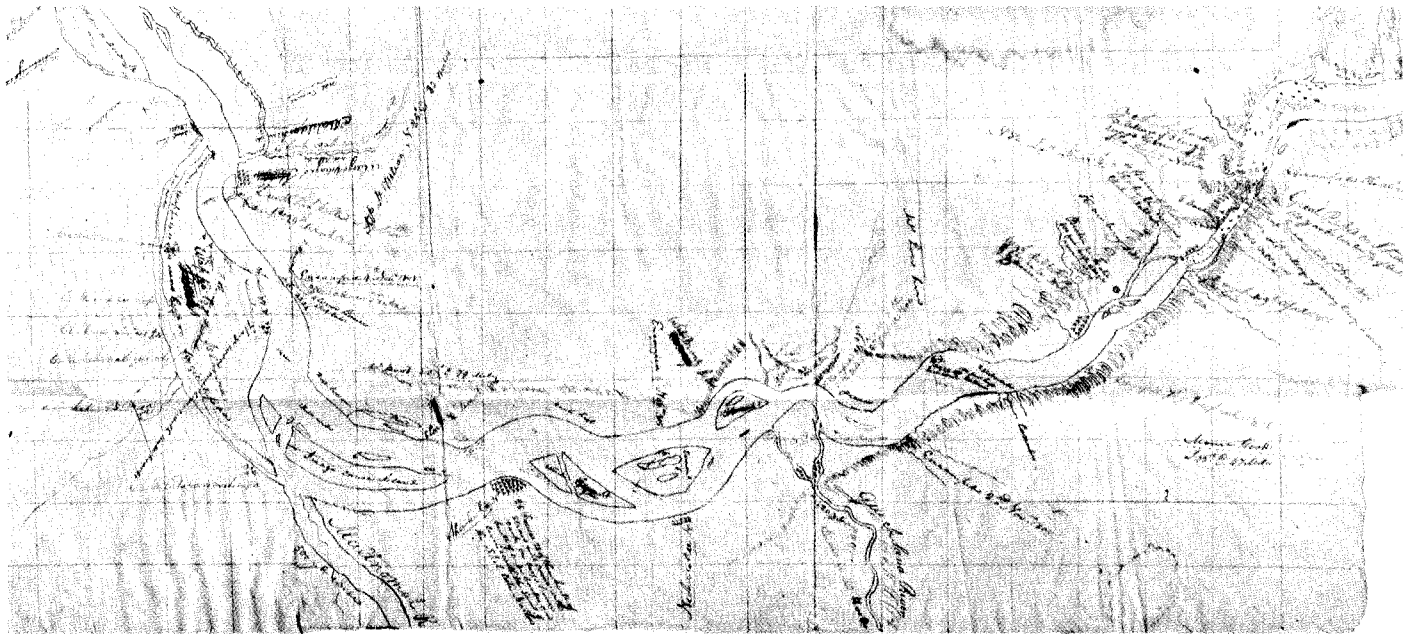
Shortly after the negotiations for the Louisiana Purchase had been completed, Jefferson appointed two Army officers, Captain Meriwether Lewis and Lieutenant William Clark, to lead an expedition across the uncharted continent to the mouth of the Columbia River. The principal aim of their reconnaissance was to find "the most direct and practicable water communication across this continent for the purposes of commerce." Reliable knowledge of the Columbia River existed since its discovery in 1792 by the American sea captain, Robert Gray, who named it for his ship, *Columbia Rediviva*. But concerning the vast extent of the land spreading to the north and west from the mouth of the Missouri to the Pacific Ocean, the only sources of information were Indian legends and tales of trappers who had ventured into the fringes of the area. The expedition, then, sought to find routes for commerce and settlement, chiefly by means of waterways.

Beginning in the spring of 1804, the expedition progressed up the Missouri to its headwaters, portaged to waters of the Columbia River Basin, and canoed to the Columbia's mouth at the Pacific Ocean. The party spent the winter of 1805-1806 near the mouth of the Columbia, where they erected Fort Clatsop. Clark and Lewis made extensive notes on the mountains and rivers, plant and animal life, soil and climate, and the Indians. A map was fashioned from the notes of the two men and relied upon for decades. Although the exploration destroyed the old dream of a waterway across the continent and indicated the difficulties involved if the land were to be settled, it also dramatically informed Americans of the vast richness of the nation. This stimulation of interest was the most important result of the expedition. Above all, the explorations of Lewis and Clark strengthened the claim of the United States to the Oregon Country and began a movement which culminated in the admission of Oregon as a state.²

While the main aims of the Lewis and Clark Expedition had been to strengthen the



right: Captain Meriwether
Lewis, far right: Lieutenant
William Clark



above: Map of area along lower reaches of the Columbia River done by a member of the Lewis and Clark Expedition in 1805.

nation's claim to the territory within the Louisiana Purchase and to determine the feasibility of using the region as a link in fostering commerce with the Orient, later Army explorations looked to development and settlement of the land. The history of the Corps of Engineers in the Oregon Country was linked to this later phase of the region's growth. In 1832, Captain Benjamin Bonneville, an 1815 graduate of West Point, requested a leave of absence from the Army to lead an exploration to the Oregon Country. Bonneville, chiefly interested in the fur trade of the area, put his military training to good use in the Oregon venture.

Captain Bonneville, taking a more southerly route than Lewis and Clark, charted extensive sections of what later became the Oregon Trail. He demonstrated that wagons could be utilized in the trip west. Bonneville made extensive notes on agricultural lands, the timber of the area, and fur-trading possibilities. He reported to his superiors in Washington, D.C. that

as to the cultivation of the bottoms of the Columbia, the lands are of the best, the timber abundant, but it is deluged at the rise of the river, but the Wallamet, runs through one of the most beautiful, fertile, and extensive vallies in the world.³

His journals showed a high admiration for the Indians (except the Blackfeet), and his encounters with them produced cordial relations with several tribes for many years. The explorations of Bonneville became well-known through the publication of his journals by Washington Irving, and helped stimulate settlement of the West.

Many years later, in 1852, Bonneville returned to the Pacific Northwest, as commander of Columbia Barracks, to plan and construct improvements at Fort Vancouver. The treaty of 1846 with England had ceded what are now the states of Oregon and Washington to the United States. While in Vancouver, Bonneville gained a reputation as something of a visionary. He believed that great benefits someday might accrue from efforts to control the Columbia River. While probably not foreseeing the tremendous future of hydroelectricity, he nonetheless saw the river, under control, as the servant of man and not his master. For this vision, Bonneville has been memorialized in the history of the Northwest by the great dam and the federal power agency which bear his name.

Lieutenant John C. Fremont made a further important contribution to the opening of the Oregon Country. Fremont, later a national hero and candidate for the presidency in 1856, served as an officer in the Topographical Corps of Engineers. Founded in 1813 in the



above: Captain Benjamin Bonneville, right: Early Fort Vancouver



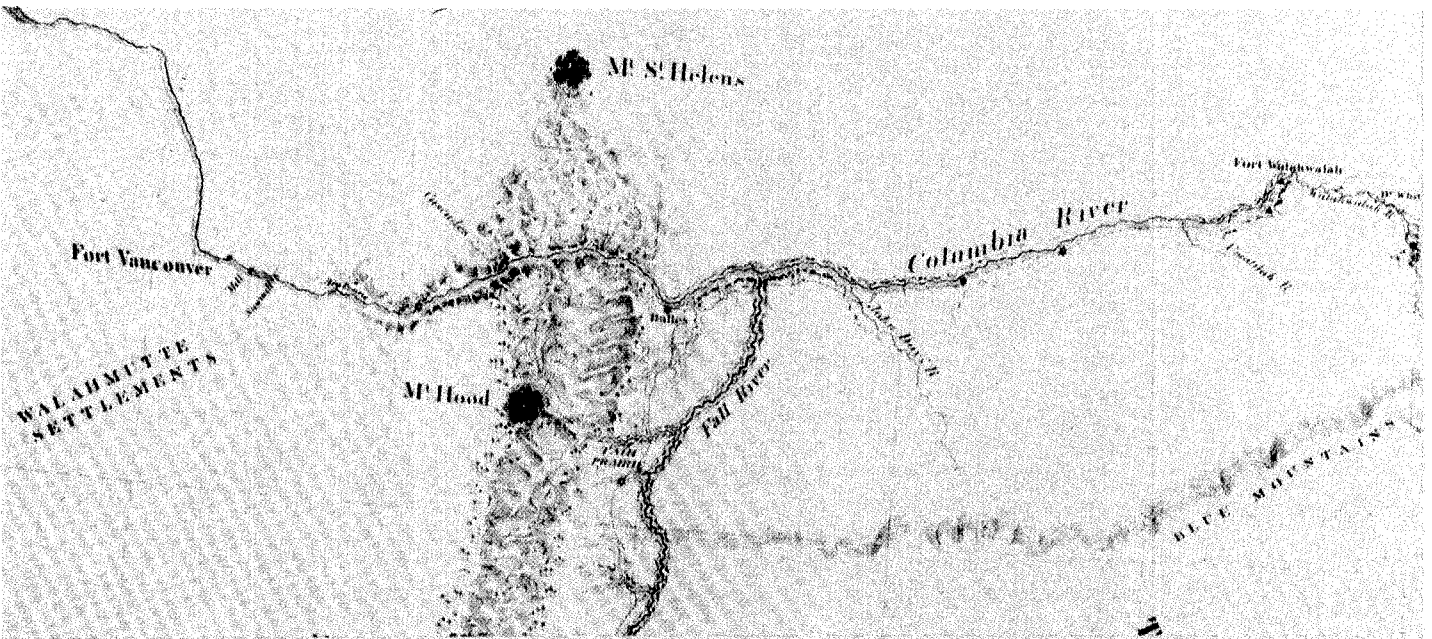
below: Lieutenant John Fremont,



Engineer Department of the U.S. Army, the Topographical Engineers conducted exploration and surveys until their functions were combined with the regular Corps of Engineers during the Civil War, and they ceased to exist. Fremont had made several surveying expeditions for the Army in the South and Middle West when he appeared before the United States Government in 1841 to request sponsorship of an exploration across the Rocky Mountains to the Pacific Northwest.⁴

At this time the leading advocate of western expansion in Washington, D.C., was the Senator from Missouri, Thomas Hart Benton. Year after year he laid before the Congress proposals to make the West a more secure part of the United States: to build a string of forts from Missouri to Oregon and occupy the mouth of the Columbia; to make explorations and to build a railroad with a northerly route to the Pacific; and to establish peaceful relations with the Indians.⁵ Fremont fully impressed upon Senator Benton that he would be able to contribute to these goals. The continued support of the Senator was assured when, in 1841, Fremont eloped with Benton's beautiful daughter Jessie.

Armed with official endorsement, Lieutenant Fremont set off in 1842 to survey what became the Oregon Trail. His first trip took him as far as the Continental Divide. There, in central Wyoming, he located South Pass, a gentle grade through the Rockies that had been discovered earlier by the fur traders, and accurately mapped its position on the Oregon Trail. Fremont investigated the geography, botany, and zoology of the regions through which he passed; made astronomical observations; and designated locations where a series of forts subsequently were constructed. On his second expedition the following year, he



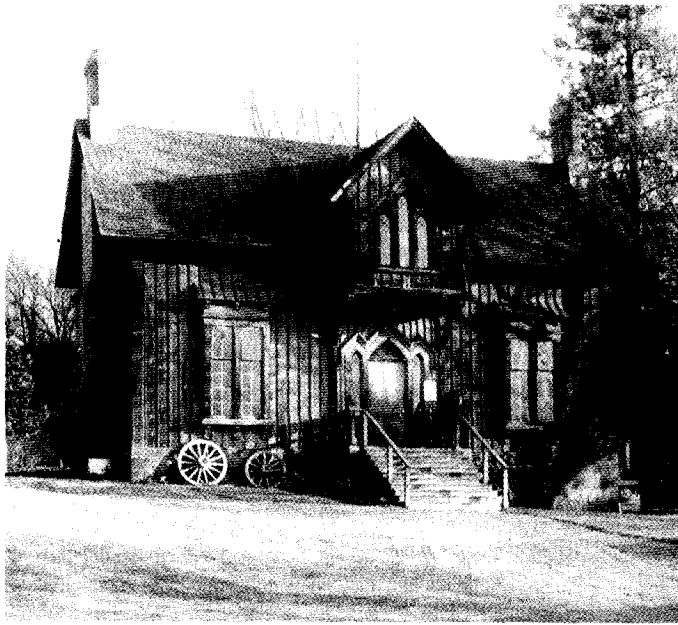
above: Fremont's map of the Columbia Gorge area.

proceeded through South Pass and along the Snake River to the Columbia. By the fall of 1843, he had visited Fort Walla Walla and The Dalles and had conferred at Fort Vancouver with Dr. John McLoughlin, Chief Factor of the Hudson's Bay Company and virtual ruler of the region.

While Fremont's chief contribution was the survey of the Oregon Trail, he also verified earlier reports concerning the richness of the land. He lamented the firm control of the area by the Hudson's Bay Company and urged that this situation be altered. Together with his powerful backing in Congress, Fremont's ability to describe vividly his exploits shaped national policy. His widely circulated published reports helped fire the imagination of many Americans about the future of the Northwest.

For roughly 20 years after Fremont's expeditions, the nation's attention was directed away from the Northwest. In this same period, Corps of Engineers non-military activity, involving navigation improvements on rivers and harbors, declined considerably throughout the nation. Initially, the war with Mexico, which lasted from 1846 to 1848, and the gold rush to California that started in 1848 caused this decline. But the main cause stemmed from the eruption of conflict between the North and South. This sectional dispute diverted attention from western development. Neither section, North or South, supported transportation improvements done in the other, east or west, of the Mississippi River. Only after the Civil War did unqualified official policy sanction civil projects by the Corps of Engineers in either the nation or Oregon.⁶

The Corps did undertake a good deal of military work in Oregon before the Civil War.



Surgeon's quarters at old Fort The Dalles, the only building left of the early fort.

The massacre of Marcus Whitman and his party in 1847 dramatized the need for a military presence to quell the growing hostility between white settlers and the Indians. Furthermore, when Oregon gained territorial status in 1848, the War Department became obligated to secure and defend it. In response to these developments, the Army embarked upon an extensive fort and road construction program. While some non-military benefits resulted from this work, until 1866 the activities of the Army in Oregon were primarily military in nature.

In 1849, five hundred dragoons and infantrymen arrived at Fort Vancouver to secure the area. While Fort Vancouver was the oldest important post in the Northwest, three other forts constructed in 1850 helped form the military backbone of the region. The Columbia River and the Puget Sound were guarded by fortifications at Astoria and Steilacoom, respectively. Fort Dalles served notably against uprisings of the Umatillas, Yakimas, Coeur D'Alenes, Spokanes, Palouses, Walla Walla, Cayuses, and Northern Paiutes, for nearly 20 years. Forts constructed later were in response to other Indian difficulties. Few traces remain of these early forts.

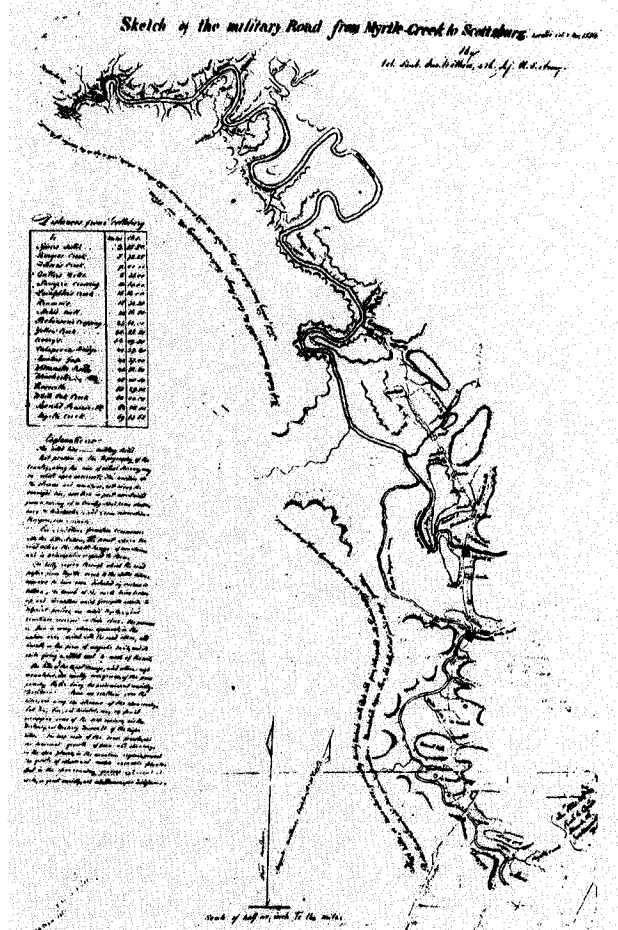
Military Wagon Roads

With the exception of the fortifications at the mouth of the Columbia begun in 1863 (see chapter 5), the Army Engineers played a small role in fort construction. Regular infantry and cavalry officers built most large forts, and groups of local mounted volunteers or other citizens erected smaller ones. The primary role of the Corps of Engineers in the pre-Civil War era of the Pacific Northwest consisted of building roads to connect isolated outposts.

The Pacific Wagon Road Office in San Francisco, established in 1855, became the first Corps of Engineers office on the West Coast. Equipment and advice came from this office to Oregon, but the main line of authority led directly to Washington, D.C. Joseph Lane, elected territorial delegate to Congress after serving as governor, worked effectively in the nation's capital to help his region. After much difficulty, he obtained an appropriation for the construction of several military roads. One went from the Rogue River Valley to Myrtle Creek. When completed it served as part of the main stage line (and eventually modern highway) from Oregon to California. Another road in southern Oregon ran northwesterly from Myrtle Creek to Scottsburg at the head of tidewater on the Umpqua River. Two other roads terminated at Fort Vancouver, one from Fort Steilacoom to the north, the other from Fort Dalles to the east. Captain George B. McClellan did the initial work on another road survey from Steilacoom to Fort Walla Walla in 1853. He later became commander in chief of Union forces in the early years of the Civil War. Congressional delegate Lane also won authorization for a military wagon road from Astoria to Salem in 1854.⁷

Officially, citizens appealing to Congress for roads spoke of them in terms of military uses. Congress approved no other type because of doubts about the constitutionality of federal construction of civilian roads. Nevertheless, every settler who had livestock to drive or who shipped personal or commercial goods by wagon stood to benefit by the opening of the roads. Moreover, the Army's ability to communicate and move forces rapidly from one part of the territory to another benefited commerce. Until the 1880s, a person who desired to build a sawmill or a farm had to consider whether the Army would be able to protect him against hostile Indians.

The Army engineers in charge of road building projects during the 1850s experienced great difficulties in carrying out their responsibilities. Lieutenant John Withers, a young infantry officer stationed at Fort Vancouver, surveyed the route from Myrtle Creek to Scottsburg but encountered local resistance to the location of his route. Settlers in the area split into opposing camps over the best route, and each side bid on the construction contract. The losing citizen group sought a court injunction to block construction of two segments of the road, but Withers got the injunction set aside and pushed work on the project. By the summer of 1855, a year after construction on the road had commenced, Withers reported to Jefferson Davis, Secretary of War, that "the road, I am confident, is as good a wagon road now as any in the country and will greatly facilitate the transporation of

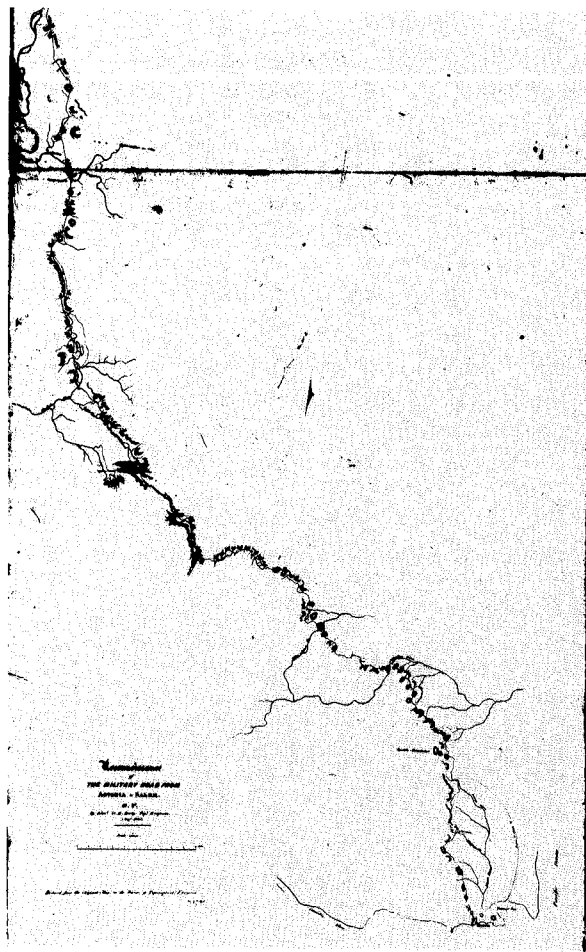


Map of Lieutenant John Withers' military road from Myrtle Creek to Scottsburg.

any government supplies to Forts Lane and Jones, by way of Scottsburg.”⁸

The proposed road from Astoria to Salem experienced delays not only from local opposition to its terminus but also from the rugged terrain through which it was built. Lieutenant George Derby, the officer in charge of the project, arrived fresh from topographical duty in California. Derby brought with him a reputation as a humorist and essayist. His favorite targets were bureaucratic red tape and military pomposity. Once in Oregon, Lieutenant Derby performed a quick reconnaissance of the terrain through which the road would pass and informed his superiors that his instructions were unworkable. He reported that “the woods are very thick, with a dense growth of underbrush, and the mountains are represented as almost impassable.” His orders called for a road 100 feet wide, but this made no sense to Derby, for “it will cost an immense sum to make a road of this width through heavy timber; the under growth is rapid, and the greater part of the avenue would be filled up in a short time.” Moreover, he felt the Bureau mistaken if it thought such a wide road would avoid blockage by fallen timber, because the virgin growth was over a hundred feet tall! Derby suggested that a road 16 feet wide would serve all practical purposes.⁹

The initial route reconnaissance proved difficult not only because of the mountainous terrain but also because of the scarcity and expense of labor and supplies. A recent gold strike had drawn off most able-bodied men and those who remained had their own ideas about work.¹⁰ Derby's civilian assistant, Thomas Bache, left in charge of the survey, reported that the men he hired lacked something of the work ethic:



Map of Lieutenant Derby's
Astoria to Salem road.

They do not seem to have the common sense to know that they receive wages to do what they are told, not what they choose. . . . I cannot explain on paper what I have gone through with such a set of the most disgusting subordinates as these Astoria men seem to be, banded together as they are their chief end and aim is to prove that they are, what they call independent. They seem to consider that the whole amount of money expended is in a measure a gift to them, that the government provisions belong to them, etc.¹¹

Since a good road already existed from the Tualatin Plains to Salem, Lieutenant Derby recommended that only 60 of the 113-mile route be built. However, believing that "the amount of the appropriation [\$30,000] would not suffice to make five miles of good road . . . [and that] the object of the appropriation is merely to get a road through at small expense," Derby proposed to let contracts for 20 miles of usable road.¹² He estimated that the full 60 miles of wagon road would require \$90,000 at a minimum. When Secretary Davis learned that funds were being spent on such a short segment of road, he cancelled the contract. Derby then was forced to personally supervise the work on a hired labor basis. He never lost his sense of humor in the affair. Asked by an Astorian why he routed the Astoria road across the rugged Saddle Mountain, Derby replied:

"I went to special pains to make my road cross the summit of every mountain and hill between Salem and Astoria. I certainly couldn't afford to miss Saddle Mountain."¹³

While completing 20 miles of the Astoria-Salem road, Derby also oversaw the construction of a military road between Fort Vancouver and Fort Dalles. After a preliminary examination of the rugged 95-mile route in October 1855, he decided that it would be impossible to construct a wagon road for less than \$1,000,000. Instead, Lieutenant Derby proposed improvement of the existing portage road at the Cascades on the Columbia River. This five-mile section, halfway between Vancouver and The Dalles, connected the steamboats plying the river route between the two points. Derby contended that a good wagon road over the portage, in conjunction with the existing steamboat navigation, would satisfy the appropriation, for a "practicable road."¹⁴ The Secretary of War adopted his plan.

Dividing his time between the two road jobs during the summer of 1856, Derby found himself beset with a host of problems. The weather was bad; and provisions and labor continued expensive and scarce in Oregon, requiring regular resupply from San Francisco in

both items. At harvest time, local farmers lured Derby's laborers with the promise of higher wages, forcing him to increase pay from \$50 to \$52 a month. The threat of Indian troubles along the portage route made it even more difficult to keep workers on the job, and the Army's slowness in providing protection for his men sorely tried Derby's patience. He sarcastically wrote to his superior officer that

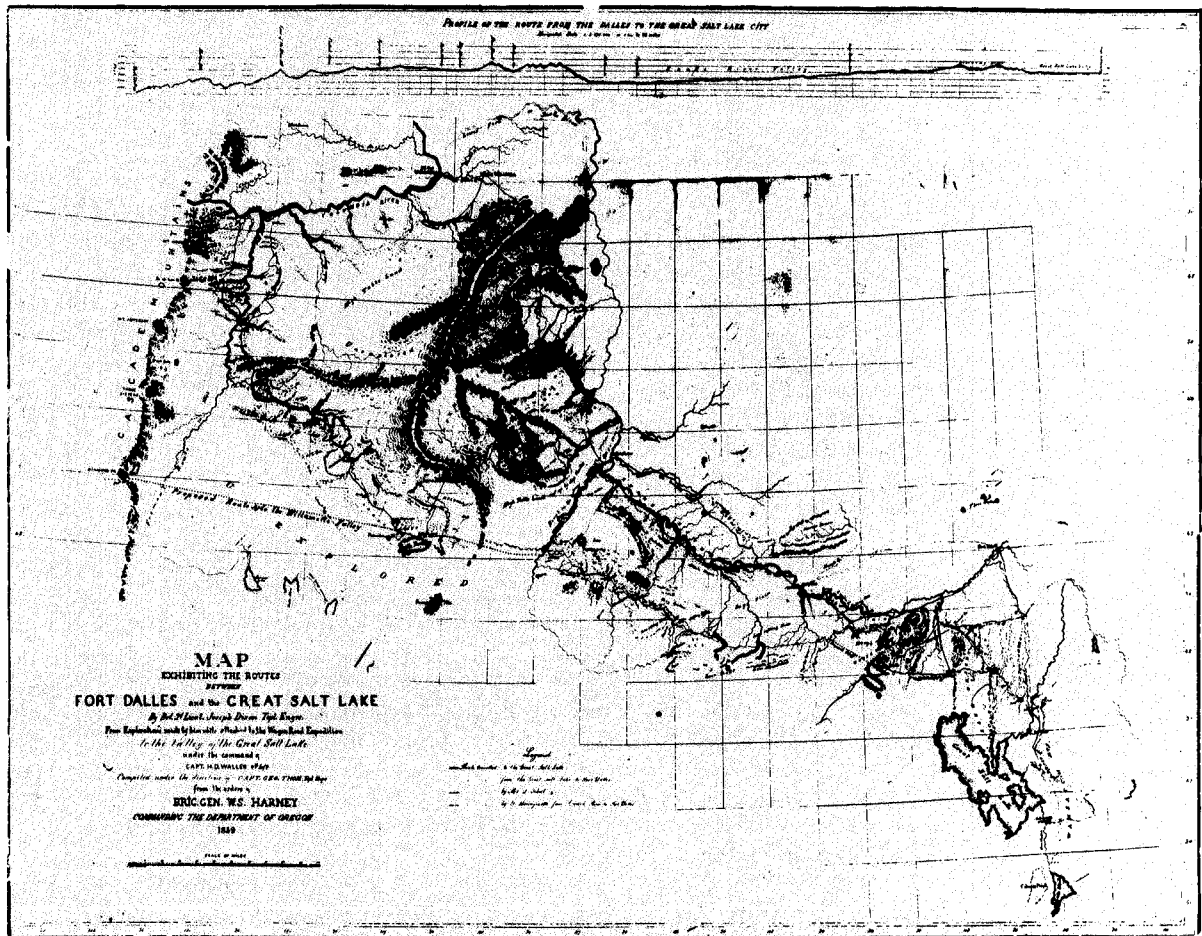
I can not see why even with the small force at the Cascades a guard should not be detailed for me, but possibly it is preferable to have an important public work obstructed and the property belonging to it lost and destroyed rather than the fixed and settled routine of military duty should be in the slightest degree disturbed.¹⁵

Finally, the local commander assigned a military guard of 21 men to protect Lieutenant Derby's work crew.¹⁶

In spite of the difficulties, when the War Department relieved Derby of his duties in October 1856, he reported 12 miles of useable wagon road and one bridge on the Astoria-Salem route finished and the entire five miles of the portage road completed. The work of the season had exhausted both appropriations. Over the next three years, Lieutenants George H. Mendell and Junius B. Wheeler labored to finish the various military road projects in the Oregon and Washington territories. Because of Congressional parsimony and the difficulty of the work itself, progress occurred slowly. While the Scottsburg and Camp Stuart roads reached completion before the Civil War, the 16-foot wide Astoria road required 15 years to finish.¹⁷

Western Army officers had long sought improvement of communications between the Columbia River and Salt Lake City. In 1859, Henry D. Wallen of the Fourth Infantry set out to find a shortcut through southeastern Oregon that would bypass the long trek over the Blue Mountains. Wallen commanded the largest and best-equipped wagon-road survey undertaken by the Army in the trans-Mississippi West. Wallen's party consisted of two companies of dragoons, one of infantry, and an engineer detachment. The expedition needed thirty wagons and an ambulance to transport its equipment and supplies. Wallen planned to go southward from The Dalles along the John Day River to its headwaters in the Blue Mountains, across the mountains to the Malheur River, and then along that stream to the Snake. There he hoped to connect his new trail to existing roads. Lieutenant Joseph Dixon served as the topographical engineer and map-maker for the expedition.¹⁸

Map of Captain Henry Wallen's Salt Lake Wagon Road.



When he discovered that the John Day River route was not practicable for a wagon road, Captain Wallen changed his direction. He marched south along the Deschutes River 70 miles and then southeast along the Crooked River to its source. His large wagons proved burdensome beyond this point, so he divided the command and sent the heavy equipment back to The Dalles with a small detachment under the direction of Lieutenant John C. Bonnycastle. The reduced force under Wallen proceeded rapidly to Lake Harney. There the terrain thwarted him again: he found no direct route to the Snake River Valley. Tracing a way along the Malheur River, Wallen expressed his frustration:

I was somewhat disappointed in our route, as I expected to find it better than it really is. A wagon road cannot be constructed over a chain of mountains such as these before us without having hills to pull over; all the science of the engineer cannot change the general features of the country.¹⁹

Winding through the rugged, wild country, the wagon-road expedition eventually reached the Snake at the mouth of the Owyhee River. From this point, Wallen followed existing trails to Salt Lake. For his return journey, he chose to travel the traditional emigrant route of the Oregon Trail across the Blue Mountains of Eastern Oregon from the Snake River to the Columbia. The wagon-road survey had traversed 1,900 miles in 4 months and 16 days.

Captain Wallen had failed to locate a new route across southeastern Oregon, and the Oregon Trail remained the shortest and most direct way to or from the Pacific Northwest. Young Lieutenant Joseph Dixon proposed further exploration southeast of Lake Harney in search of a practicable wagon road, but before such an expedition could be undertaken the Civil War intervened.

Throughout the late 1850s, Army engineers conducted numerous other topographic reconnaissances. Most of these were part of the Army's efforts to pacify the troublesome Indians of the Pacific Northwest. Whenever troops marched into the interior from Fort Vancouver, an engineer usually accompanied them. He selected and mapped the best routes for future travel and communication, always investigating the terrain over which he passed with an eye to its future agricultural possibilities.

The topographic engineers' descriptive accounts of the region's climate, geography, and botany and of the lifestyle of the native inhabitants often found their way into the printed reports of Congress and provided more information to an eastern audience, avid for knowledge of the exotic West. When sympathetic to the Indians, these reports proved controversial. Captain Thomas Cram's *Topographic Memoir of the Department of the Pacific*, highly critical of the white settler's treatment of the Indians in the Oregon Country, went to Congress with a disclaimer from the Secretary of War:

A large portion of the report is devoted to subjects irrelevant to its objects, as indicated by the title and duties of Captain Cram, and contains animadversions upon public functionaries, which are out of place in a topographical communication, and which are, in no sense, sanctioned or endorsed by this department.²⁰

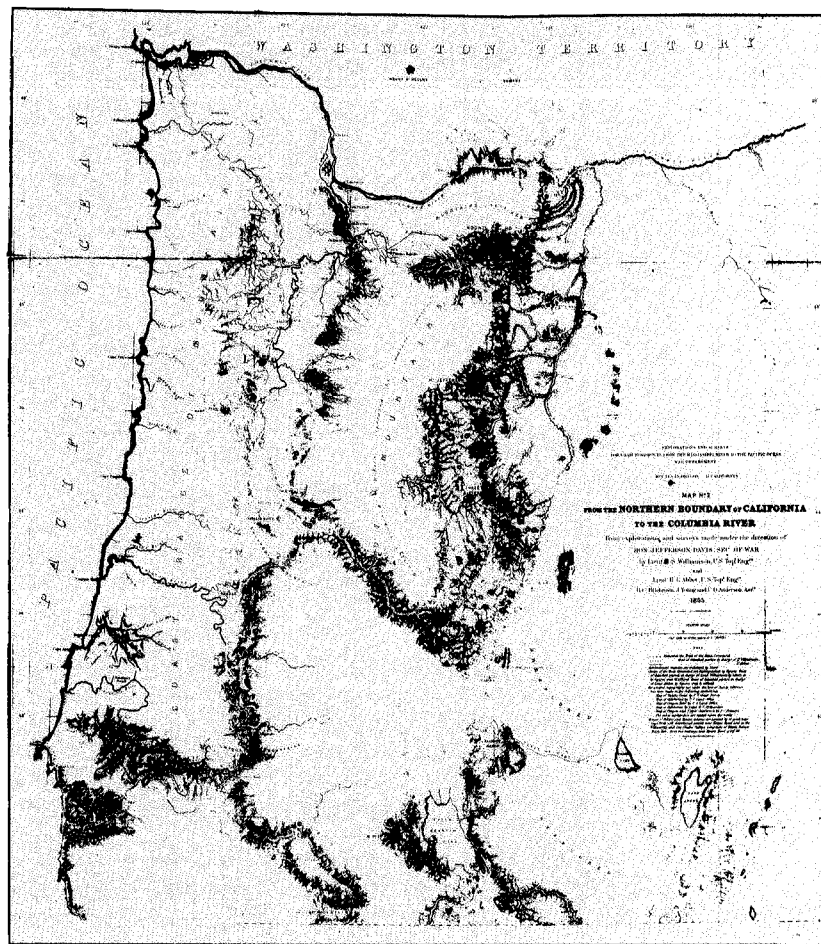
Other reports, such as Lieutenant Mendell's "Topographical Memoir of the Country from Fort Dalles to Fort Boise," contained conventional evaluations of the Indians more acceptable to the settlers who wished to displace them from rich agricultural lands and confine them to reservations. Mendell, after rhapsodizing on the luxuriant bunchgrass of northeastern Oregon and its adaptability to grazing, referred to some of the Indians of the area as "filthy in their habits—eating beetles and vermine without compunction. They are very poor and owing to their improvidence often suffer from hunger in winter."²¹

In addition to local examinations, pre-Civil War Army engineers surveyed transcontinental railroad routes. Issac Ingalls Stevens, a topographical engineer who graduated at the top of his class at West Point in 1839 and became the first governor of Washington Territory, conducted one portion of the famous Pacific railroad surveys. While on his way from St. Paul, Minnesota, in 1853 to assume his duties as governor, Stevens and a survey party found a way through the Cascade Mountains to Puget Sound. The Great Northern Railroad later followed his route. Lieutenant James H. Wilson, another Army engineer, surveyed a line from Puget Sound to the Columbia River that the Northern Pacific Railroad subsequently used.

To round out the Pacific railroad survey, Lieutenants Robert S. Williamson and Henry L. Abbot led an expedition north from San Francisco to the Columbia River. After passing through northern California and the Klamath Country of southern Oregon, the survey party explored central Oregon, the Cascade Mountains, and the Willamette Valley. Abbot's report revealed a practicable route through the Willamette Valley, which the Southern Pacific Railroad later followed, and provided valuable new information about the agricultural possibilities of the region explored.²²

The Civil War turned the Army's energies away from western development and military projects not contributing directly to the war effort. Only a skeleton Army force remained in Oregon. While the most important achievements of the Corps of Engineers lay

1855 map of Oregon area
survey for railroad route from
the Mississippi River to the
Pacific Ocean.



ahead, the significance of the prewar road-building program should not be underestimated. The period during which the Army built roads generally coincided with a time of drastic contraction of Corps activities; when the Civil War ended, a great expansion occurred. Yet, the \$280,000 spent on roads alone in Oregon during the ten years prior to the Civil War represented a major commitment of federal resources to that remote region.

The close of the Civil War released the energies of the nation and ushered in an age of tremendous growth in the United States. In the forty years after Appomattox, the vast expanse of the American West was finally settled. At the same time, the combination of rich natural resources, rapid growth in population, encouraging governmental policies, and an innovative business community dramatically shifted the economic base of the nation from agriculture to manufacturing and industry. At the dawn of the twentieth century the United States emerged as a world power.

Early River Work

Development of the West reflected these national trends. With the establishment in 1866 of an engineering office under the authority, "Rivers and Harbors of the Pacific Coast," Army engineer activity in the Far West reached an equal footing with that in the rest of the nation.²³ This office, with its headquarters in San Francisco, included all of the Pacific Northwest within its boundaries. Major Robert Williamson served as the first engineer in charge of this western regional office. Serving in California since 1859, he had carried out extensive surveys of the mountains of northern California and southern Oregon for the Pacific railroad survey. Williamson's first duties in Oregon under the new authority required improving navigation on the Willamette and Columbia Rivers, where private and local efforts had proved ineffectual.

In 1865, the City of Portland paid \$42,000 in gold coin for dredging equipment. Two river bars—one at Swan Island and another at the mouth of the Willamette—presented dangerous obstacles to ocean-going vessels. Many ships with deeper drafts could not negotiate these shoals when fully loaded; indeed, ships grounded on them almost daily. These shoals meant that goods from Portland had to be hauled by small vessels or wagons to points on the Columbia River below the mouth of the Willamette, where ocean-going ships could safely take the cargo aboard. Since this was not usually a profitable alternative, many ocean vessels contained the products of towns downriver from Portland. With 15-foot draft ocean-going ships arriving in Portland each month, these bars constituted obstacles to Portland's growth and prosperity. Moreover, most people in the Pacific Northwest regarded

such conditions as intolerable, since the region depended upon Portland as the chief outlet for its mineral and agricultural produce.

Municipal dredging work on the bars did not progress satisfactorily. To complete the work, city officials petitioned Congress for the assistance of the Corps of Engineers. Oregon Congressmen obtained an appropriation, and in 1866 Major Williamson started on the job. Since the Corps had no dredging equipment of its own, Major Williamson advertised for bids, but all the bids, including that of the City of Portland, exceeded the amount of the appropriation. To solve the problem, the City of Portland in 1867 proposed to loan its dredging equipment, free of charge, to the Corps under the condition that the Corps complete the work and be responsible for damages to the equipment beyond normal wear and tear. Major Williamson accepted the offer and commenced the project with hired help the following year. His assistant in Oregon, Lieutenant William H. Heuer, performed the surveys and supervised the dredging on the Willamette River.²⁴

The work also involved the first snagging activities on rivers in the Northwest by the Corps. Huge logs, or snags, firmly embedded in the mud and silt of the bank or bottom of rivers, posed a treacherous threat to navigation. Only a pilot who knew the river well could safely negotiate these hazards. With the water level varying seasonally, snags often hid just below the waterline and ripped open the hulls of unsuspecting ships. After snags disabled his own dredging craft several times, Lieutenant Heuer decided to remove them. By the time the engineers had cut a 17-foot channel out of the two bars in 1869, many snags had been removed as well.²⁵ In 1870, Major Williamson reported a dramatic improvement on the Willamette:

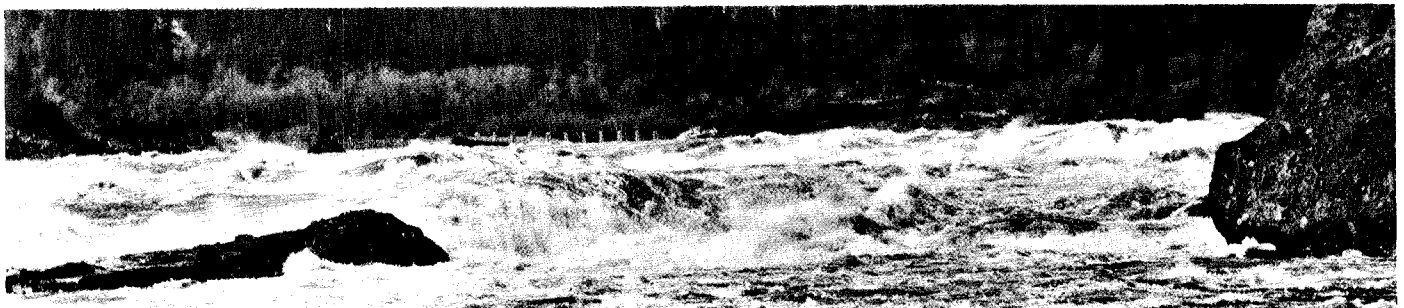
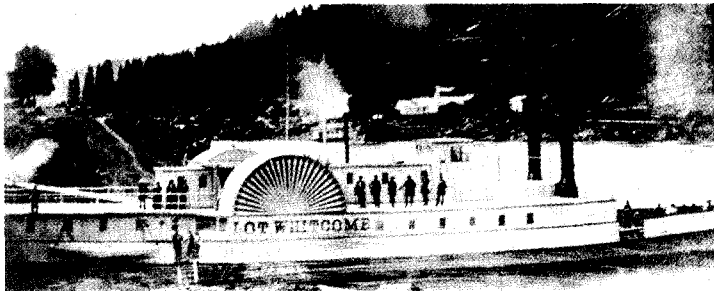
*The amount of commerce to be benefited by the completion of this work is very great. Ocean steamers measuring 2,000 tons leave San Francisco weekly for Portland, and a large number of sailing vessels ply regularly between the two cities. The improvements already made have been very beneficial, for the reason that not a single vessel has grounded on the bar during the last year, previous to which time, during low water seasons, grounding was an almost every-day occurrence.*²⁶

Keeping the newly created channel open required annual dredging. This dredging and snagging activity represented the first river and harbor work of the Corps of Engineers in Oregon, and a significant boost to shipping on the Columbia and Willamette Rivers.

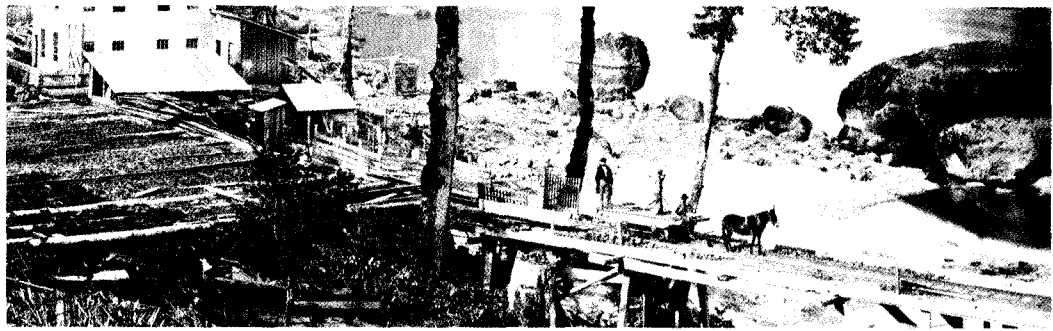
The steamboat era on the Columbia River began in 1850. In May of that year, the Pacific Mail Company inaugurated monthly steamer service between San Francisco and Portland. Commercial interests in Astoria constructed the first steamboat on the Columbia and placed it in operation in July 1850. Christened the *Columbia*, the 90 by 16-foot vessel possessed a speed of four miles an hour and took two days to travel the 100 miles between Astoria and Portland. The launching of the *Lot Whitcomb* at Milwaukie, Oregon on Christmas Day, 1850, broke the *Columbia's* monopoly of river traffic. This boat, a sidewheeler 160 feet long, could do 12 miles per hour. Soon, other steamers commenced service on the Columbia River. John C. Ainsworth, the first captain of the *Lot Whitcomb*, later became a founder of the powerful Oregon Steam Navigation Company (OSNC).²⁷

Increased military traffic during the Indian difficulties of the 1850s and 1860s, gold discoveries in Eastern Oregon and Idaho in the 1860s, and the growth of wheat farming on

right: The Lot Whitcome steamer which operated on the Columbia River of the 1850s. below: The Cascade Rapids, a major navigation hazard of the early Columbia River.



Mule portage on the Oregon side of the Cascades



the Columbia Plateau all stimulated expansion of steamboat shipping on the Columbia River. Treacherous rapids necessitated portages at two locations: the Cascade Rapids and Celilo Falls. Nevertheless, by the early 1860s steamboats operated regularly from Portland 217 miles up river to Umatilla City. Growth in shipping led to the replacement of mule-powered tramways around the obstructions with steam-powered railways. The Oregon Steam Navigation Company formed a transportation monopoly, dominating commercial traffic on the river from 1860 until the end of the century.

The coming of the railroads in the 1880s greatly reduced shipping on the Columbia. The railroad's faster service, and oftentimes cheaper rates, left only bulk transport to the steamers. But in the 20 years following the Civil War they dominated transportation, and their successful operation required navigational improvements. The factors which caused the OSNC to thrive—wheat export, mining rushes, supply import, and transport of passengers—justified work by the Corps of Engineers. In addition to dredging and snagging work, Major Williamson surveyed the Columbia River from Portland to the mouth of the Snake. John C. Ainsworth, President of the OSNC, had suggested the survey of the river so that the several dangerous rapids of the upper Columbia could be eliminated.

In 1867, Ainsworth directed the Corps' attention to three rapids in the upper Columbia River: the Umatilla, Homly, and John Day. Umatilla Rapids, 107 miles above The Dalles, were located where McNary Dam now stands. Homly Rapids, 130 miles above The Dalles, and just below the mouth of the Snake River, are covered by the slackwater of the upper end of the McNary Dam pool. John Day Rapids, 33 miles above The Dalles and just below the John Day Dam, are submerged beneath the upper end of The Dalles Dam pool. Many boats ran on the rocks at these obstructions. In low water only the most experienced pilot could negotiate them, and even then at considerable risk. Boats were guided slowly through the rapids by lines extending to the shore. Even with these precautions, during low-water periods only the very shallow-draft riverboats passed up or down stream. These small riverboats proved wholly inadequate to ship the quantities of grain then available. Ainsworth summed up his case for Corps improvements by emphasizing the relationship of agriculture and transportation:

Cheap freight is one of the first importance to an agricultural country. To secure this to the valleys tributary to the upper Columbia, it is absolutely necessary that the navigation be so improved as to make it practicable for the use of the largest class boats at all stages of water.²⁸

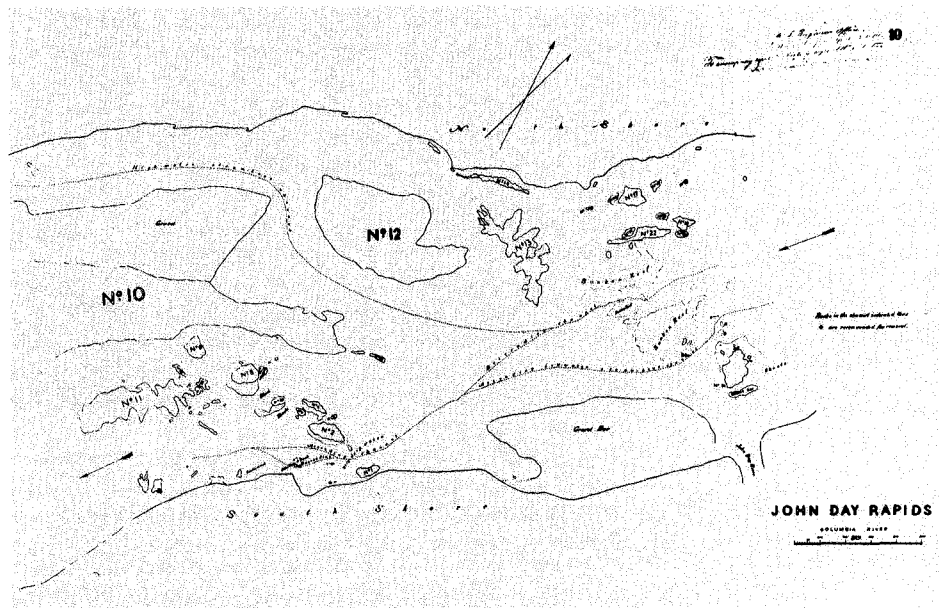
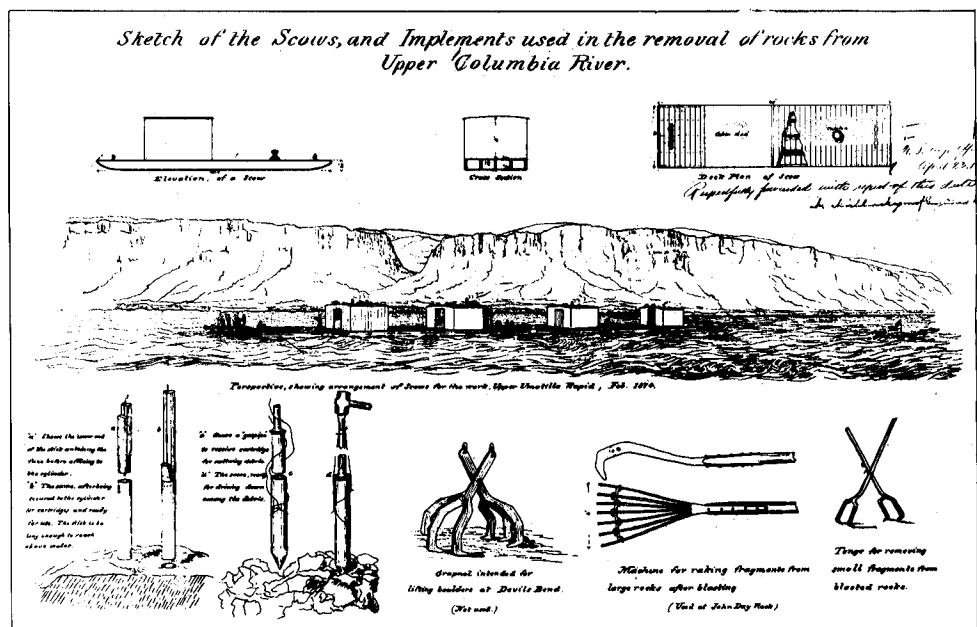


Chart of the John Day Rapids in the Upper Columbia River

Major Williamson assigned Heuer to determine which rapids obstructed navigation, how much rock had to be removed, and at what cost, so that six-foot-draft boats could navigate at all seasons. The surveyors began in September 1867 at low water, but because of bad weather and boat damage they completed only half the work by the following spring. By the next autumn, the engineers had finished the survey and completed a blasting experiment on John Day Rock. The varying intensity and direction of the current, depending on the stage and fall of the river, made the survey of the rapids both tedious and dangerous. It required anchoring a small boat above the rapids and then allowing it to drop into the turbulent waters to take numerous soundings. The surveying party maneuvered the craft about the rapids with lead-lines and steering-oar. The strength of the current often deflected the lead-lines, rendering many of the soundings in depths over 30 feet only approximations.²⁹

The removal of John Day Rock, the chief impediment to navigation, tested Heuer's ingenuity. The Columbia, at that time a swift and powerful river with numerous rapids, required the work parties to approach their labor with extreme caution. Heuer, in his report to Major Williamson, described the water as "fearfully rapid," stating that he "dared not attempt sounding" in some areas with the equipment at his disposal.³⁰ Because of these severe conditions, Lieutenant Heuer's initial attempt in the fall of 1867 to use a boat to place a torpedo with a 200-pound charge of blasting powder on the rock proved "anything but successful."³¹

In the fall of 1868, Heuer assaulted the rock again. He constructed a 1,200-pound cast-



Drawing of equipment used in early removal of Upper Columbia rapids.

iron frame which he attached to the rock as a drilling platform to place the blasting charge. Laborers drilled powder holes in the rock with a three-man drill which made only 12 inches per day. Broken drill bits caused repeated delays, since the nearest blacksmith who could repair them was 30 miles away at The Dalles. Despite the difficulties, Heuer eventually completed his survey of the upper Columbia and concluded his experiments for removing the John Day Rock.³² Based on Heuer's preliminary findings, the Office of the Chief of Engineers authorized the work to proceed; and by 1873, John Day Rock was blasted out to a depth of seven feet below mean water. The engineers also eliminated three rocks at Umatilla Rapids to improve the river for navigation.³³

Williamson also supervised surveys of the Willamette River. These examined the mouth of the river, Willamette Slough, and the river above the falls at Oregon City to Corvallis. Corvallis marked the upriver limit of the survey; the obstacles at low water above there were so numerous and so difficult to remove that improvement was not thought practical.³⁴ Lieutenant Heuer, who performed the survey, reported that navigation past Corvallis occurred only seasonally:

Steamboats navigate the river between Oregon City and Salem (sixty-five miles) during the entire year, and as far as Corvallis, forty-two miles above Salem, during nine months of the year. During a high-water stage of the river, they run up as far as Eugene City, about eighty miles above Salem.³⁴

At the time of the survey, the People's Transportation Company monopolized the shipping trade on the river, running seven steamships above the falls at Oregon City and

two below. Lieutenant Heuer studied the river carefully. He noted five major sandbars and proposed the appropriation of \$16,000 to construct wing dams to eliminate the obstructions. Eventually this was done.

Wing dams directed the flow of water into the middle of the stream. As Lieutenant Heuer described them, they were

of the simplest construction, consisting of logs 2 feet in diameter and long as possible, to be thrown diagonally across the current and held in position by four piles, two at each end of the log; willow brush to be lodged against the upper side, and held in place by gravel.³⁶

The dams forced the current against the material forming the bar, washing it downstream to areas of greater depth. Generally satisfactory devices, engineers used the dams for years on the rivers of the Northwest. However, unless carefully designed, they merely moved the bar downstream, or, if the current was deflected too sharply, washed out the opposite bank. The pile dikes built later on the Columbia were essentially larger, sturdier wing dams.

Other work supervised by Major Williamson included an extensive examination of the Umpqua River in southern Oregon. A trade route from the interior to the coast would avoid the long haul overland and down the Willamette for the farmers of the Umpqua Valley. After convincing the Chief of Engineers that the usual preliminary examination would waste time and money, Williamson personally supervised a full-scale survey of the river. He and Lieutenant Heuer had intended to descend the river from Roseburg to its mouth by skiff, but no one was willing to pilot them. They then hired a wagon and descended to the head of navigation on their own. Following the survey, Williamson recommended expending \$20,294 for the removal of rocks from the rapids; and in 1871 Congress appropriated \$22,500 for the work.³⁷

Major Williamson had yet another responsibility. Since 1831, Army engineer officers had assisted the Treasury Department in the construction of lighthouses. The functions of the officers were somewhat informally allocated, consisting of disbursement of funds and design and supervisory duties. In 1832 the Lighthouse Board was created under the Secretary of the Treasury to have entire charge of the construction, maintenance, superintendence, and operation of lighthouses. Serving on the board as co-equals with the Army engineer officers were two naval officers and two civilians. Until 1910, when the military personnel of each branch were replaced with civilians, the Corps of Engineers contributed to the federal lighthouse construction program. Thus, when Major Williamson went to the West Coast, he took up duties in the 13th Lighthouse District. Subsequent engineer officers or district engineers in the Pacific Northwest held the same assignment until 1910.³⁸

below: Oregon coast lighthouse typical of those which the early Corps of Engineers assisted the U.S. Treasury Department to construct.

